

B.Sc. 3rd Semester (Honours) Examination, 2020(CBCS)

Subject: Statistics

Course: CC-5

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

The notations or symbols have their usual meaning.

Time: 2 hrs

Full Marks: 40

Linear Algebra and Numerical Analysis

Answer any *eight* from the following:

8X5=40

1. Suppose A is a real square matrix such that $A^2 = A$. Show that rank of A is equal to the trace of A .
2. Show that row rank is equal to the column rank of any matrix.
3. Suppose $x' = (1, 2, 3)$, $y' = (4, 5, 6)$ and $z' = (7, 8, 9)$ are three vectors. Can these vectors generate \mathbb{R}^3 ?
4. Show that for any square real matrix A , there always exists a symmetric matrix B such that $x'Ax = x'Bx$ holds for every x .
5. Let S_1 and S_2 be two vector spaces. Show that $S_1 \cup S_2$ may not be a vector space but $S_1 + S_2$ always represents a vector space.
6. Derive Newton-Raphson method for finding root.
7. Develop Newton's backward interpolation formula.
8. What is transcendental equation? What is your preferable numerical method for finding a real root of a 5-th degree polynomial?
9. Show that n -th difference of a n -th degree polynomial gives a constant value.
10. What do you mean by numerical integration? Describe a numerical integration technique.